

DRAWING AMENDMENTS:

Figures 10 and 11 are newly added to the application to show invention features described in the specification. A single “New Sheet” including Figures 10 and 11 is attached at Appendix A of this Reply.

REMARKS

Claims 1, 5-8, 12, 37 and 50-61 are pending in the application.

Claims 17 and 62-65 stand withdrawn from consideration with traverse.

The specification is amended to add new Figures 10 and 11. The specification is further amended above to include a description of the new figures. No new matter is added to the application by these amendments.

I. THE MAY 4, 2005 INFORMATION DISCLOSURE STATEMENT

A. The Examiner's Final Rejection Was Non-Responsive

In the first Office Action, the examiner indicated that he did not consider certain references in the IDS submitted by the Applicant on May 4, 2005 because the examiner claims there was no concise explanation of the relevancy of the references. Applicant provided evidence in its Office Action Reply of 11/12/07 that it submitted a Concise Statement of the Relevancy of Foreign Language References with it May 14, 2005 IDS and asked the examiner to consider the references and initial the Applicant's IDS form accordingly. The Final Rejection is non-responsive on this point.

B. The Examiner Must Now Consider All References In the May 4, 2005 IDS

The Applicant demonstrated in the Office Action Reply submitted on 11/12/2007 that they filed a Concise Statement of Relevancy of (1) FR 2686410; (2) FR 2742221; (3) EP 0738869; (4) EP 0334731; and (5) DE3007307 with the May 4, 2005 IDS submission. The examiner is asked to either initial Applicant's May 4, 2005 IDS to show that the examiner has now considered all references or to indicate the examiner's basis for continuing to refuse to consider some of the reference cited in the May 4, 2005 IDS so that the Applicant has a basis for appealing the examiner's decision.

II. THE ELECTION/RESTRICTION

The examiner withdrew new claims 63-65 from consideration because they allegedly are directed to an invention independent and distinct from the originally claimed invention. The examiner's withdrawal of claims 63-65 is traversed.

The examiner's withdrawal of claims 64 and 65 from consideration is without merit

because the claims depend upon claim 1 or 52 – which are being considered by the examiner. Since the claims depend from and further limit the claims being examined, then they cannot define a different invention.

Moreover, the Applicant maintains the position that claims 17 and 62-63 are unified with claim 1. 37 CFR 1.475 clearly states that unity should be considered for an invention with more than one type of claim category, particularly option c) A product, a process specifically adapted for the manufacture of the said product and a use of said product:-

In the present application all claims are dependent upon claim 1. Therefore, claims 1, 17 and 62 must all require the same single inventive concept which is that the annulus is a shape memory alloy wherein said:

"shape memory alloy...[is] ...subjected to a combination of mechanical and thermal treatments... ...[so as to impart a memory]... wherein upon subsequent heating (of the annulus, either by external means or an internal heater, specifically the latter in the case of claim 17) to a predetermined temperature... [causes] ...the annulus [to] contract radially inwardly and rupture the said munitions casing."

This feature which is common to all three claim categories - product, method of use and method of manufacture - requires that all application claims be considered together.

III. THE DRAWINGS

The examiner objected to the drawings because they do not show a cutting means or a heater. New Figures 10 and 11 – which show the allegedly missing features – are added to the application in the Reply. The specification is amended above to describe the new Figures. The Figure descriptions added to the specification are merely portions of original specification paragraphs that have been duplicated and to which figure designations have been added. The Figure and specification amendments do not, therefore, add new matter to the specification.

IV. THE EXAMINER'S CLAIM INTERPRETATION

The examiner maintained his position that no patentable weight should be given to certain claim 1 terms because the terms are directed to the manner of making the device rather than to an aspect of the apparatus. However, both limitations provide **definite boundaries** on the patent protection sought and are therefore perfectly acceptable having regard to 35 USC 112, second

paragraph. Moreover, it is irrelevant that the second phrase is a functional limitation because there is ample precedent to establish **that functional limitations are appropriate in claims and should be afforded patentable weight.**

The Examiner first suggests that the claim 1 phrase “which has been subject to a combination of mechanical and thermal treatments” has no patentable weight. That phrase was clarified in Applicant’s last response to read “which has been subject to a combination of mechanical and thermal treatments so as to impart a memory”. Examiner has not commented on this. In order for the invention to operate, the shape memory alloy must have its “memory” imparted prior to being located around the munition. Claim 1 is therefore directed to a subset of shape memory alloys, *i.e.*, a shape memory alloy that has been subjected to thermal treatments that give it a “memory”. Indeed such a physical property could easily be tested by a skilled man by heating the alloy above its transition temperature; if it has a memory it will shrink; if not, it will remain unchanged. Therefore, the whole phrase clearly defines a **current physical property** of the alloy used in the claimed invention – the alloy has been imparted with a memory. Therefore, the term must be given patentable weight.

The Examiner next indicates that the claim 1 phrase: “upon subsequent heating to a predetermined temperature, said annulus will contract radially inwards and rupture the said munitions casing” was not given patentable weight since it is directed to an intended use of the apparatus. The examiner is not correct in this regard. Once again, the phrase the examiner did not consider was rewritten and now reads: “upon subsequent heating to a predetermined temperature, said memory causes said annulus to contract radially inwards and rupture the said munitions casing”. That phrase – which is not the subject of the examiner’s final rejection - does not merely relate to an intended use but rather defines, in functional terms, a **current physical property** of the apparatus. The improperly ignored phrase requires the relative thickness of the annulus, casing and respective arrangements and the extent of shape memory to be such that the combination causes a casing rupture to occur when the alloy is heated above its predetermined temperature. The ignored functional limitation is a **technical property** of the shape memory alloy and the Examiner must give the phrase patentable weight.

A functional limitation is perfectly acceptable in a claim, as confirmed in the MPEP 2173.05(g):-

“A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). **There is nothing inherently wrong with defining some part of an invention in functional terms.** Functional language does not, in and of itself, render a claim improper. In *re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971). “

In the decision in *Swinehart* it was found that patentability over the prior art could be determined by "what the feature does rather than what the feature is". The CCPA stated:- *"There is nothing intrinsically wrong with the use of such a technique in drafting patent claims. Indeed we have even recognised in the past the practical necessity of the use of functional language."* In the Applicant's invention, the requirement that the annulus is capable of rupturing the munition casing is a necessary and unavoidable functional limitation.

The Examiner is also respectfully directed to the decision in [*re Land*], where the CCPA acknowledged that the distinguishing feature between the application and that of the prior art was functional. The decision went on to say that "although portions of the claim were functional, it is not good ground to give them no patentable weight" especially in view of 35 USC 112, paragraph 6, which states:- *"An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."* Moreover, in the decision of *Mills*, the Appeal court found in favor of the Applicant, and held that the difference between the claim and the prior art lay specifically in the functional limitations of the "pump means", even though that was the only limitation that provided patentability over the prior art. Therefore the functional limitation of the Applicant's invention, namely, to be capable of rupturing a munitions casing, should be given patentable weight and is capable by itself of conferring patentability.

The MPEP 2173.05(g) also makes it clear that functional limitations are allowable providing, as in the case of any limitation, they clearly define the scope of protection, quoting *In re Barr*:- *"It was held that the limitation used to define a radical on a chemical compound as "incapable of forming a dye with said oxidizing developing agent" although functional, was perfectly acceptable because it set definite boundaries on the patent protection sought. In re Barr, 444 F.2d 588, 170 USPQ 33 (CCPA 1971)."* It is submitted that the present limitation is inherently clear in scope and it can be easily tested – if upon heating the SMA to the

predetermined temperature, the SMA annulus causes the casing to rupture, the apparatus is inside the scope of claim 1. Thus the metes and bounds of claim 1 are clearly defined and fulfil the requirements of 35 USC 112. For each of these reasons it is submitted that the two phrases in claim 1 must be accorded patentable weight.

V. THE ANTICIPATION REJECTION

The Examiner continues to reject claims 1, 5, 12, 37, 52-54 and 56-61 for being anticipated by St. Amand (USP 6,019,025). That rejection is unjustified. As confirmed by *Land* and *Mills* quoted above, functional limitations in a claim are to be given patentable weight, even in the situation where it is only the functional limitations that distinguish over the prior art. If all claim 1 terms are given their proper weight, then it is impossible for St. Amand to anticipate any application claims.

St. Amand does not disclose an SMA annulus wherein “upon subsequent heating to a predetermined temperature, said memory causes said annulus to contract radially inwards and rupture the said munitions casing”. That functional limitation in claim 1, when given due patentable weight, provides a patentable distinction over the cited art. For this reason alone, the alleged anticipation is unfounded.

St Amand is directed to a retractable seal, where an SMA annulus is used to reposition the seal. Thus, in common with the present invention, the annulus in the prior art invention has a memory effect imparted. However, that is where the similarity ends. The Applicant's invention is directed to a rupturing shape memory alloy annulus, i.e. one that upon activation will move radially inwards and cause rupturing of the munition casing. By contrast, the annulus in St. Amand operates only on a flexible O-ring seal and has no detrimental effect on the munition casing, i.e. causing no structural damage whatsoever to the CLS or launch tube. There is no disclosure in St. Amand of a shape memory alloy annulus with the ability to penetrate the casing of the munition. Indeed, St. Amand teaches away from this at column 2 lines 39-42, where it clearly states that the operation of the device is to provide a retractable seal, the action of which, does not damage the weapon or the launch tube. Accordingly, all pending claims are novel over St. Amand.

VI. THE OBVIOUSNESS REJECTION

The examiner finally rejected claims 37 and 50 for being unpatentable for obviousness over St. Amand.

Claims 37 and 50 are non-obvious and patentable by virtue of their dependence upon claim 1 which is patentable for the reasons recited in Section V above.

Claim 50 is also independently patentable. The examiner suggests that the skilled man would readily use a plurality of wire windings in place of a solid annulus. The Applicant disagrees with the examiner's presumption. There is no suggestion or even the merest hint in St. Amand that the SMA annulus may be formed from anything other than a solid annulus. The Applicant considers that the examiner is impermissibly using the benefit of hindsight to establish that a wire winding is an obvious alternative to a solid annulus

Furthermore, the use of wire windings in the Applicant's invention provides a useful and unexpected advantage. The Applicant directs the examiner to the disclosure in St Amand, regarding the installation of the annulus, which is disclosed in Col 5, lines 19 to 27.

The shape memory alloy ring 26 is made large enough to slip over the munition 16 (and thus also the O-ring seal), and when located over the O-ring seal 24, the annulus is heated to contract onto the O-ring seal.

The Applicant has disclosed on page 12, final para of the PCT published application that the wire with its memory imparted, may be wound onto the munition, i.e. there is no requirement to heat or activate the annulus in order to locate it on the munition. Indeed the Applicant's disclosure later in the same paragraph that the use of a wire will find particular benefit if the body of the munition is tapered or waisted. For example, if the point on the munition, where the annulus is to be located, has a diameter significantly smaller than either of the terminal ends of the munition, then the use of a solid annulus will require significant engineering for it to be installed at that narrowed point. Clearly, a wire with a memory already imparted may simply be wound on at the correct location on the munition. Furthermore, the use of a wire type annulus in the case of St Amand would significantly facilitate their installation procedure of said annulus. The Applicant considers that if the use of a wire were that obvious, then St Amand would have employed the

easiest and most obvious methods. Therefore, claim 50 is both novel and non-obvious in its own right.

CONCLUSION

Pending application claims 1, 5-8, 12, 37 and 50-61 are believed to be patentable for the reasons set forth above. Favorable reconsideration and allowance of all pending application claims is, therefore, courteously solicited.

Respectfully submitted,

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Appendix A